

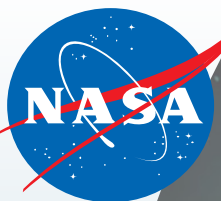
# Recent NEPP Program Work and Fiscal Year 2022 Plans

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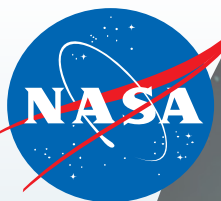




# Agenda

- NEPP Mission
- Focus Areas
- FY21 Highlights
- FY22 Plans
- NASA NEWS



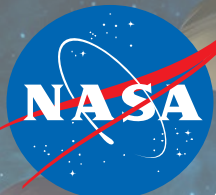


# NEPP – Mission Statement

Provide NASA's **leadership** in the development and maintenance of **guidance** to support the reliable use of EEEE parts through characterization, lot acceptance, screening, and qualification testing in **collaboration** with academia, industry, international partners, and domestic government agencies.



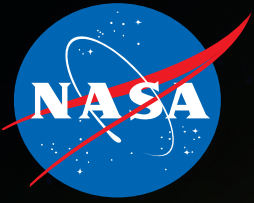
*NASA Electronic Parts Assurance Group  
(NEPAG) is a core portion of NEPP*



# NEPP Focus Areas







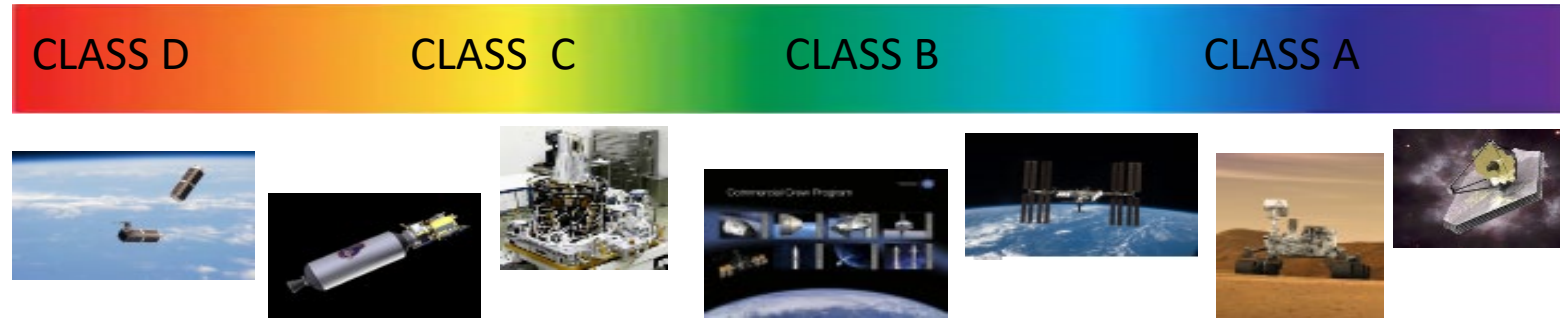
# FY21 Highlights







# Standards & Policy and Guideline Development



## Participating in the Development of a NASA Engineering and Safety Center (NESC) Technical Assessment Report

- Title: *Recommendations on Use of Commercial-Off-The-Shelf (COTS) Electrical, Electronic, and Electromechanical (EEE) Parts for NASA Missions*
- Available for public download at NASA Technical Reports Server <https://ntrs.nasa.gov/>
- Currently in Phase II of Assessment including more government agencies (FAA, NAVSEA, MDA, etc.) and inviting manufacturers to discuss COTS manufacturing
  - Objectives are to define term *Industry Leading Parts Manufacturers* and to understand methods that manufacturers use to measure quality, assurance, and reliability.
  - Goal is for report to be made available to public once through the release process.

To be presented virtually by P. Majewicz at the 2022 Microelectronics Reliability & Qualification Workshop (MRQW), 8Feb22



# Standards & Policy and Guideline Development



NASA/NESC completed development of:

- Title: *Avionics Radiation Hardness Assurance (RHA) Best Practices*
- Available for public download at NASA Technical Reports Server  
<https://ntrs.nasa.gov/>
- Covers total ionizing dose, total non-ionizing dose, and single-event effects
- Will form the basis of a new NASA technical standard for RHA.
  - Development of the new standard will begin in the second half of CY2021







# 2021 NEPP Electronic Technology Workshop

MILSPECs – Incorporation of Plastics (4)

Processors, FPGAs & Memories (9)

Photonics (2)

Collaborations/Working Groups (3)

WBG (3)

Advanced Packaging (2.5/3D, etc.) (5)

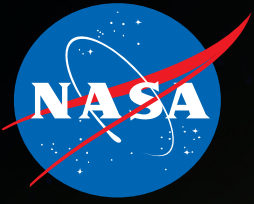
Passives: Capacitors and Resistors (6)

Training / Tutorials (2)

Small Sats & COTS Utilization (7)

Model Based Mission Assurance (MBMA) (2)

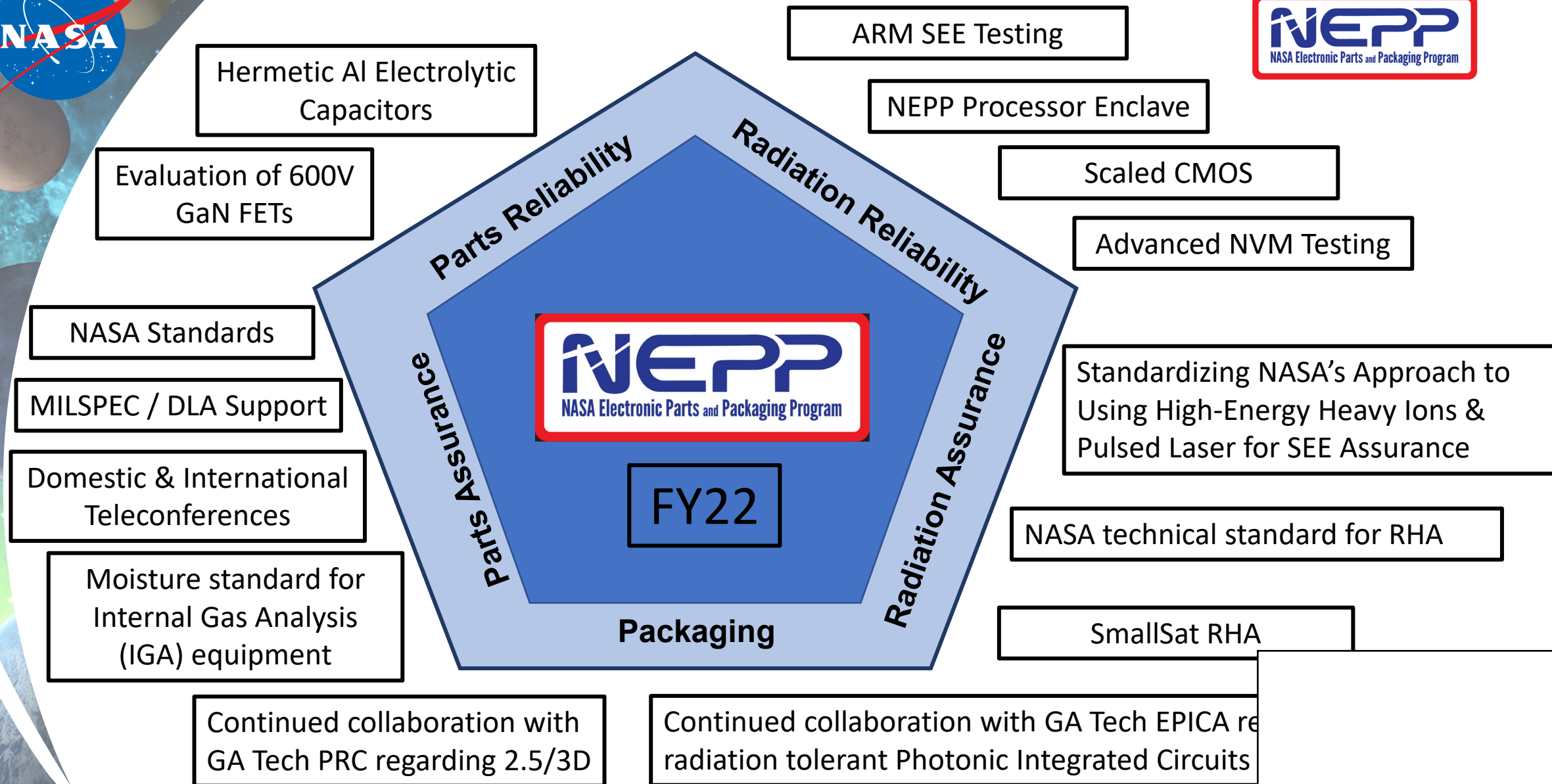
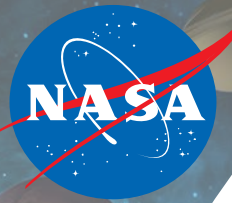
*All NETW presentations for 2021 and past years are at <https://nepp.nasa.gov/>*



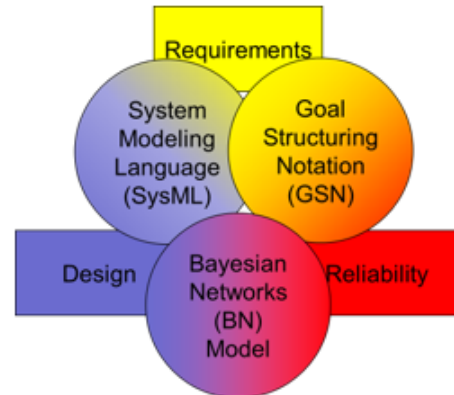
# FY22 Plans



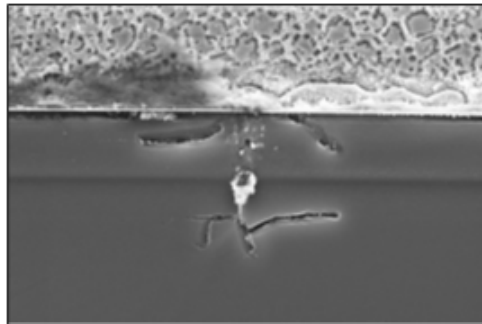








**Emerging Assurance Methods**  
*Image Credit: Vanderbilt University*



**Advanced Technology Reliability**  
*Image Credit: NASA*

2021-08-31

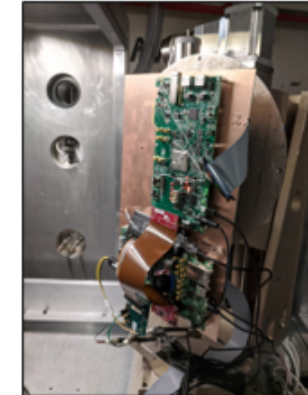
**SAVE THE DATE!**

## **13<sup>th</sup> Annual NEPP Electronics Technology Workshop (ETW)**

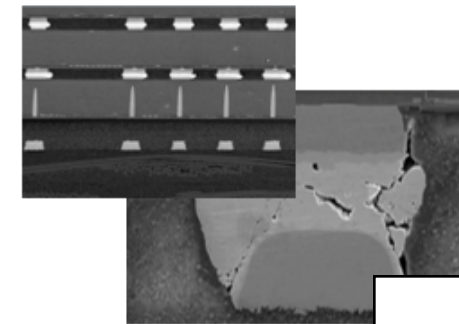
**Scheduled dates:**  
**June 13-16, 2022**

<https://nepp.nasa.gov/>

2021 Single-Event Effects Symposium / Military and Aerospace  
Programmable Logic Device Combined Workshop



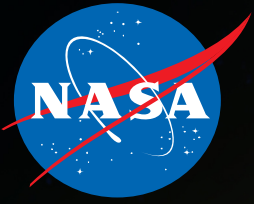
**Radiation Testing & Analysis**  
*Image Credit: NASA*



**Advanced Microelectronics Pa**  
*Image Credit: NASA*



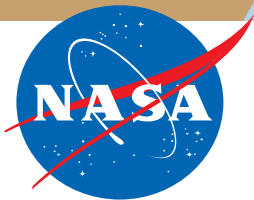




# NASA News







# James Webb Space Telescope

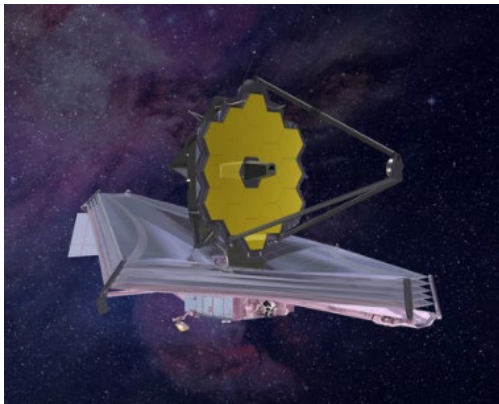


Photo credit: NASA



Photo credit: NASA



Photo credit: NASA



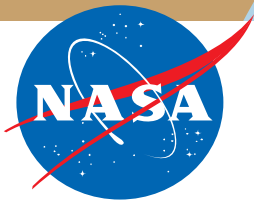
Photo credit: NASA

- Launch date: 25 Dec 21

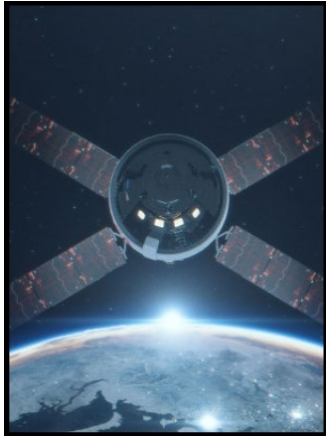
Deployment animation: <https://www.youtube.com/playlist?list=PL691BF261E32A4420> video: 5 min, actual: 13 days







Space Launch System  
Rocket



Orion Spacecraft



Exploration Ground  
Systems



Artemis  
Base Camp



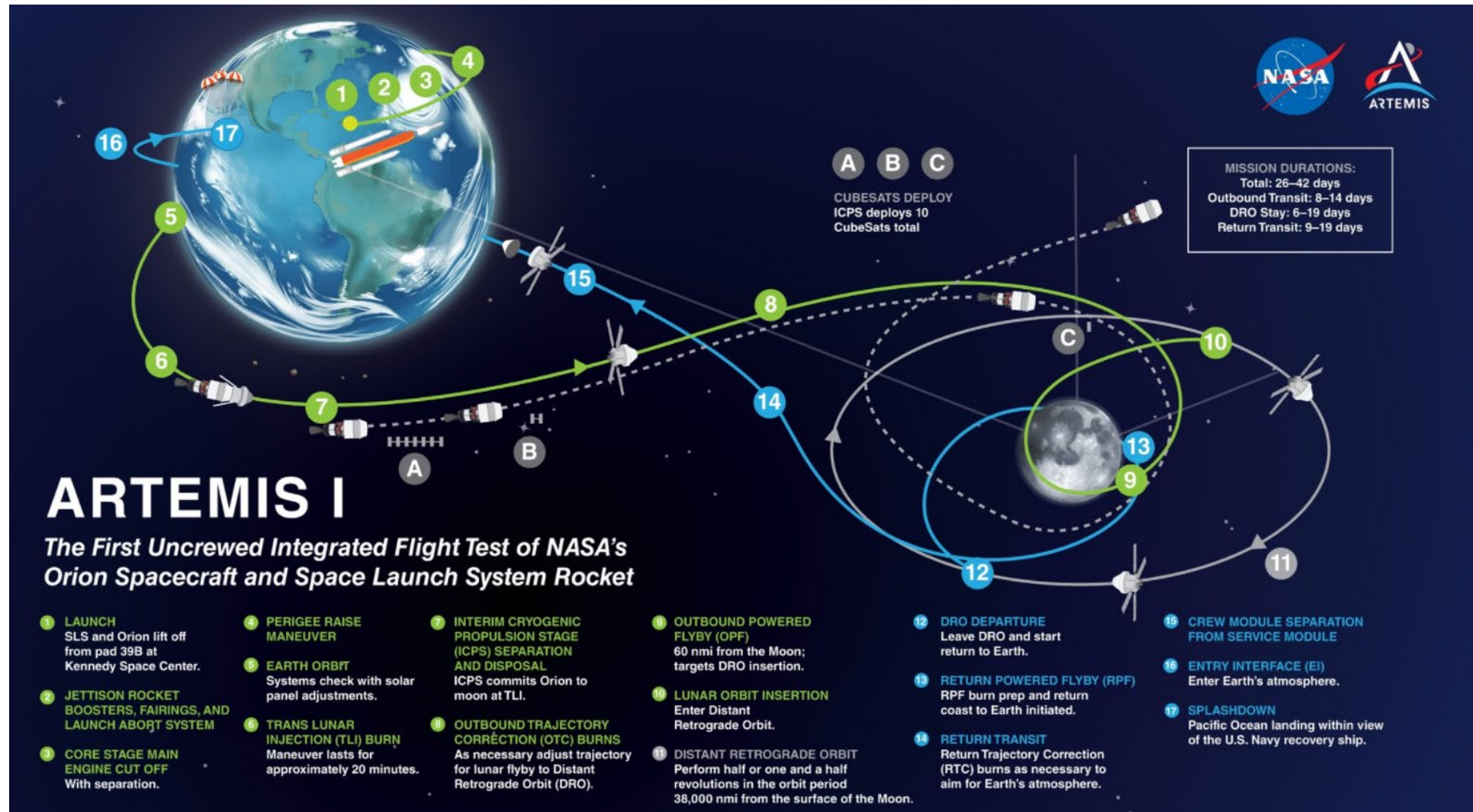
Gateway



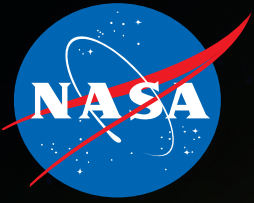
Human  
Landing System

<https://www.youtube.com/watch?v=EQEPrJjk1pM>



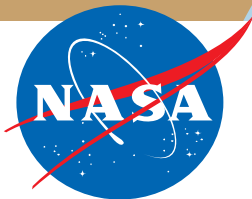






# The End





# Acronyms



Abbreviation	Definition	Abbreviation	Definition
AF	Air Force	NASA	National Aeronautics and Space Administration
BGA	Ball Grid Array	NEPAG	NASA Electronic Parts Assurance Group
BN	Bayesian Network	NEPP	NASA Electronic Parts and Packaging (Program)
BoK	Body of Knowledge	NESC	NASA Engineering and Safety Center
CMOS	Complementary Metal Oxide Semiconductor	NODIS	NASA Online Directives Information System
COTS	Commercial Off the Shelf	NPR	NASA Procedural Requirement
CPU	Central Processing Unit	NRO	National Reconnaissance Office
DDR	Double Data Rate	NSREC	Nuclear and Space Radiation Effects Conference
DLA	Defense Logistics Agency	OCE	Office of the Chief Engineer
DMEA	Defense Microelectronics Activity	OGA	Other Government Agency
DoD	Department of Defense	PIC	Photonic Integrated Circuit
DoE	Department of Energy	POC	Point of Contact
EEE	Electrical, Electronic, and Electromechanical	PoF	Physics of Failure
ETW	Electronics Technology Workshop	RF	Radio Frequency
FPGA	Field Programmable Gate Array	RH	Radiation Hardened
GaN	Gallium Nitride	RHA	Radiation Hardness Assurance
GIDEP	Government Industry Data Exchange Program	SAPP	Space Asset Protection Program
GPU	Graphics Processing Unit	SDRAM	Synchronous Dynamic Random Access Memory
GRC	Glenn Research Center	SEE	Single-Event Effects
GSFC	Goddard Space Flight Center	SIC	Silicon Carbide
GSN	Goal Structuring Notation	SMA	Safety and Mission Assurance
HQ	Headquarters	SMC	Space and Missile Systems Center
IC	Integrated Circuit	SOA	Safe Operating Area
IEEE	Institute of Electrical and Electronics Engineers	SoC	System on a Chip
JPL	Jet Propulsion Laboratory	SRAM	Static Random Access Memory
JSC	Johnson Space Center	SSAI	Science Systems and Applications, Inc.
LaRC	Langley Research Center	STMD	Space Technology Mission Directorate
LGA	Land Grid Array	STT	Spin Transfer Torque
MAPLD	Military and Aerospace Programmable Logic Devices (Workshop)	SysML	System Modeling Language
MBMA	Model-Based Mission Assurance	TID	Total Ionizing Dose
MRAM	Magnetic Random Access Memory	TSV	Thru-Silicon Via
MSFC	Marshall Space Flight Center		